National Climatic Data Center

DATA DOCUMENTATION

FOR

DATA SET 3241 (DSI-3241)

Hourly Precipitation Data: Special ASOS Network

March 19, 2003

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

:

Table of Contents

1. Abstract: The observations in the Hourly Precipitation Data File were taken by observers at principle (primary) stations beginning in May of 1995. There are approximately 150 stations in the data set. All stations are located in the continental United States (i.e. the 48 contiguous states and Alaska.) It is important to note that some stations have sent data sporadically. In addition, only partial data may be available for a data month. No data for the July 1995 data month is available. The data will process on a monthly basis as long as funding continues. The data is generally available 45 days after the end of the data month.

The data were recorded on paper charts by the Universal Rain gauge. The Universal Rain gauge has a pen arm that continuously scribes a line on a chart that corresponds to the weight of contents in the gauge's holding bucket. The gauge has a 0.01" resolution. Value amounts of a Trace "T" in the data set were known because of denoting as such by National Weather Service personnel. The National Weather Service continued to fund the operational expenses of the Universal Rain guages at many principle stations after the sites were converted to ASOS.

Please remember, the data archived for a station in DSI-3240 may be different from the data archived for the same station in DSI-3241. This is due to the fact that different recording instruments were involved in the precipitation collection process. It must also be noted that NCDC has the observations from the time the station opened, but the NWS has the current data. Official surface weather observation standards can be found in the Federal Meteorological Handbook.

Data are archived in a variable length element file structure. Archived data are currently sorted by Station-ID (excluding the Division Number) as the primary key and year, month, and day as secondary keys. Data may also be received in a fixed length record structure.

Each record contains one day of one station's occurrences of precipitation. The record consists of a control word and identification portion, and a data portion. The control word is used by the computer operating system for record length determination. The identification portion identifies the observing station, year, month, day, and record element units code. The data portion contains the hour, precipitation occurrence and measurement flags. The data portion is repeated for as many values as occur in the given time interval.

It stands to reason that for most hours, the non-occurrence of precipitation is prevalent. Therefore, in order to save space in the digital file, there are entries only for:

1. Hours with precipitation > zero.
2. Beginning and ending hours of missing periods.
3. Beginning and ending hours of accumulating periods.

2. Element Names and Definitions:

FIELD	POSITION	NAME	CODE DEFINITIONS AND REMARKS
001	1-3	Record-Type	The type of data stored in this record. Value is "HPD".

002	4-11	Station-ID	This 8-character station identifier is assigned by the National Climatic Data Center. It identifies 3 areas.
	4-5	State-Code	STATE CODE as indicated. Range of value is 01 to 48, and 50.

STATE CODE TABLE

01 Alabama	28 New Jersey
02 Arizona	29 New Mexico
03 Arkansas	30 New York
04 California	31 North Carolina
05 Colorado	32 North Dakota
06 Connecticut	33 Ohio
07 Delaware	34 Oklahoma
08 Florida	35 Oregon
09 Georgia	36 Pennsylvania
10 Idaho	37 Rhode Island
11 Illinois	38 South Carolina
12 Indiana	39 South Dakota
13 Iowa	40 Tennessee
14 Kansas	41 Texas
15 Kentucky	42 Utah
16 Louisiana	43 Vermont
17 Maine	44 Virginia
18 Maryland	45 Washington
19 Massachusetts	46 West Virginia
20 Michigan	47 Wisconsin
21 Minnesota	48 Wyoming
22 Mississippi	49 Not Used
23 Missouri	50 Alaska
24 Montana	
25 Nebraska	
26 Nevada	
27 New Hampshire	

	6-9	Cooperative Network Index (Station List)	Cooperative Network Index Number assigned by NCDC. Range 0001 thru 9999.
	10-11	Cooperative Network Division Number	Cooperative Network Division Number. For data prior to November 1993, the division number will always be 00. For data since November 1993, the division number ranges from 01-10.
003	12-15	Element-Type	The type of data element stored in this record. Range of values is listed below.
		UNHP	Universal hourly precipitation data.

			This is the only data type reported. (Includes the daily total.)
004	16-17	Element-Units	The units and decimal position of the data value for this record. Range of values is listed below.
		HI	Hundredths of inches. Data stored and observed to the same accuracy.
005	18-21	Year	This is the year of record. Range of values is generally from May 1995-current year processed. July 1995 is unavailable.
006	22-23	Month	Month of record. Range of value is 01-12.
007	24-27	Day	Day of record. Range of value 0001-0031.
008	28-30	Number Reported Values.	This denotes the actual number of Reported values. Range of values is 2 to 25.

NOTE: A record may contain fewer or more data values than you might expect. A daily record of hourly values may contain as few as 2 data values or as many as 25 data values. Only hours which have recorded precipitation are included (no entry for zero precipitation). There are some exceptions: 1) the begin and end hours of a missing or accumulation period are reported. See Flag 1 definitions for further details.

009	31-34	Time-Of-Value	This contains the ending time of precipitation 0100-2500. (Example, hour 0200 is defined as the period 0101-0200) The hour is left justified, zero filled. Hour 2500 contains the daily total, and it will always be the last value of a record. Midnight = 2400. Local Standard Time in use.
010	35-40	Data-Value	The actual precipitation data value. The data value portion is a five-digit integer with a leading algebraic sign. The sign is blank for positive and "-" represents negative values("-" never used in this data set). Units and decimal

			position, if appropriate, are indicated in the ELEMENT-UNITS field described in Field 004. Range = 00000-99999. On other days during the month without precipitation, no entry will be made. 99999 indicates that the DATA-VALUE is unknown. A trace is indicated by 00000 recorded in this element (Data-Value) and a "T" in FLAG1.
011	41	FLAG1	The Data Measurement Flag.
	FLAG1 Table (Data Measurement Flag for Hourly Data-Values)		
		a	Begin accumulation. A value of 99999 accompanies this flag. For TD3241, it indicates that the accumulation has begun sometime during the hour.
		A	End accumulation (amount is associated with this flag). For TD3241, it indicates the accumulation has ended sometime during the hour. Accumulated period indicates that the precipitation amount is correct, but only the exact beginning and ending times are known. An accumulated daily value of 00000 with a "T" flag can occur.
		[	Begin missing period during the hour (inclusive). A value of 99999 accompanies this flag
		]	End missing period during the hour (inclusive) A value of 99999 accompanies this flag.
		g	Only used when a station reports no precipation for the month.
		T	Indicates a "trace" amount. Data value will be zero.
		b	(blank) no Flag needed.
	FLAG1 Table (Data Measurement Flag for Daily Total Data-Values)		
		I	Incomplete or Inexact daily total occurring only with hour 2500. Value is not a true 24-hour amount. One or more periods are missing and/or an accumulated amount has begun but not ended during the daily period.

P	A daily total excludes erroneous values (those flagged q, Q, {, or }. A "P" flag will also be present when an accumulation has ended (but not begun) during the daily period.
T	TRACE, Flag1 will contain a □T□ flag in the daily total if no values other than a TRACE occurred during the 24 hour period. An accumulated daily TRACE can occur.
b	(blank) no Flag needed.

---

012 42 FLAG2 The Data Quality Flag.

FLAG2 Table (Data Quality Flag)

b	(blank) no Flag needed.

EXAMPLES OF HOW FLAGS ARE USED. NOTE: blank = b

Example 1: precipitation accumulation from Month 1, day 02 to Month 2, day 04.

Month	Day	Hour	Data Value	
01	0002	0500	00030bb	Precip. 0.3 inches
		1000	99999ab	Accumulation begins
		2500	00030Ib	Incomplete daily total
01	0031	2400	99999Ab	Accumulation continues
		2500	00000Ib	Incomplete daily total
02	0001	0100	99999,b	Accumulation continues
		2500	00000Ib	Incomplete daily total
	0004	1400	00390Ab	Accumulation ends
		2500	00390Pb	Incomplete daily total

Example 2: Accumulated precipitation for 1 month only.

01	0002	1000	99999ab	Accumulation begins
		2500	00000Ib	Incomplete daily total
	0031	2400	00320Ab	Accumulation ends
		2500	00320Pb	Incomplete daily total

Example 3: Accumulated and missing precipitation data through months 01 and 02.

01	0001	0100	00000gb	First record of the month
	0002	1100	99999ab	Accumulation begins
		2500	00000Ib	Incomplete daily total
01	0031	2400	99999Ab	Accumulation continues

:

		2500	00000Ib	Incomplete daily total
02	0001	0100	99999,b	Accumulation continues
		1400	00630Ab	Accumulation ends
		2500	00630Pb	Incomplete daily total
02	0028	1400	99999[b	Missing data
		2400	99999]b	Missing data
		2500	00000Pb	Incomplete daily total

3. **Start Date**: 19950501. July 95 is missing.

4. **Stop Date**: Ongoing

5. **Coverage**:

a. Southernmost Latitude: 24 Degrees 33 Minutes N (Key West)
b. Northernmost Latitude: 57 Degrees 45 Minutes N (Kodiak)
c. Westernmost Longitude: 170 Degrees 13 Minutes W (St. Paul Is.)
d. Easternmost Longitude: 68 Degrees 01 Minutes W (Caribou)

6. **How to Order Data**:

Ask NCDC's Climate Services about the cost of obtaining this data set.
Phone: 828-271-4800
FAX: 828-271-4876
e-mail: **NCDC.Orders@noaa.gov**

7. **Archiving Data Center**:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001

8. **Technical Contact**:

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
Phone: 828-271-4800;

9. **Known Uncorrected Problems**: None. July 95 data are not available.

10. **Quality Statement**: Data is recorded on Universal Rain gauge charts. The data values are then extracted from the charts and the data is keyed. Prior the archiving, the data is processed through the same "last look" quality assurance software as is DSI-3240 data. This should result in maintaining consistency between DSI-3240 and DSI-3241 data. Please remember, the data archived for a station in DSI-3241 may be different from the data archived for the same station in DSI-3240. This is due to the fact that different recording instruments were involved in the precipitation collection process.

11. **Essential Companion Datasets**: The use of NCDC's Station History file (DSI-9767) is required in order to determine metadata on each station (name, location, elevation, etc.). This can be accomplished by comparing the station number in bytes 1 through 6 of this data set with the corresponding station

number in the Station History data set.

12. References:

Tollerud, E. I., M. W. Govett, P. M. Steurer, and W. R. Moninger, 1997: New access and display routines for hourly precipitation data and metadata using CD-ROMs and the World Wide Web. Preprints, 105th Conf. on Applied Meteorology, Reno, Nevada, American Meteorological Society.

Steurer, P.M., 1997: Hourly Precipitation Data rehabilitation for the period 1900-1995. NOAA/NCDC TD3240 Documentation Series, Asheville, NC, 5 pp.

Hammer, G.R. and P.M. Steurer, 1997: Data set documentation for Hourly Precipitation Data. NOAA/NCDC TD3240 Documentation Series, Asheville, NC, 18 pp.

Hammer, G.R. and T. Reek, 1997: The Processing of Recording Rain Gauge Data at the National Climatic Data Center. Proceedings of the 13th Conference on Hydrology, Long Beach, California, American Meteorological Society, 223-226.

Collander, R.S., E.I. Tollerud, L. Li, and A. Lazar, 1993: Hourly precipitation data and station histories: A research assessment. Proceeding of the 8th Symposium on Meteorological Observations and Instrumentation, Anaheim, California, American Meteorological Society.

National Weather Service Observing Handbook No. 2: Cooperative Station Observations, July 1989, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Observing Systems Branch, Silver Spring, MD.

Phillips, C., 1985: An objective method for minimizing non-precipitation effects in precipitation data from punched paper tape. Proceedings of the International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology, Los Angeles, California, American Meteorological Society, 178-182.